

CLAIMS

1. (original) A magnesium-based, semi-solid casting alloy having improved elevated temperature performance when cast from a semi-solid alloy slurry, the alloy comprising, in weight percent, from about 3 to 7% aluminum, from about 0.5 to 3% strontium, with the balance being magnesium, except for impurities commonly found in magnesium alloys, wherein, the semi-solid alloy slurry includes up to about 20% of a solid fraction by weight.
2. (original) The magnesium-based, semi-solid casting alloy of claim 1, wherein the alloy comprises 4.5 to 5.5% aluminum.
3. (original) The magnesium-based, semi-solid casting alloy of claim 1, wherein the alloy comprises from 1.2 to 2.2% strontium.
4. (original) The magnesium-based, semi-solid casting alloy of claim 2, wherein the alloy comprises from 1.2 to 2.2% strontium.
5. (original) The magnesium-based, semi-solid casting alloy of claim 1, wherein when cast, the casting has an average % creep deformation at 150°C of less than or equal to about 0.04%, an average ultimate tensile strength at 150°C of at least about 174 MPa, an average tensile yield strength at 150°C of at least about 112 MPa, and an average % elongation at 150°C of less than or equal to about 20%.
6. (original) The magnesium-based, semi-solid casting alloy of claim 5, wherein when cast, the casting has an average % creep deformation at 150°C of about 0.04%, an average ultimate tensile strength at 150°C of about 174 MPa, an average tensile yield strength at 150°C of about 112 MPa, and an average % elongation at 150°C of about 20%.
7. (original) A magnesium-based, semi-solid casting alloy having improved elevated temperature performance when cast from a semi-solid alloy slurry, the alloy comprising, in weight percent, from about 3 to 7% aluminum, from about 0.5 to 3% strontium, with the balance being magnesium, except for impurities commonly found in magnesium alloys, wherein, the semi-solid alloy slurry includes up to about 5% of a solid fraction by weight.
8. (original) The magnesium-based, semi-solid casting alloy of claim 7, wherein the

alloy comprises from 4.5 to 5.5% aluminum.

9. (original) The magnesium-based, semi-solid casting alloy of claim 7, wherein the alloy comprises from 1.2 to 2.2% strontium.

10. (original) The magnesium-based, semi-solid casting alloy of claim 8, wherein the alloy comprises from 1.2 to 2.2% strontium.

11. (original) The magnesium-based, semi-solid casting alloy of claim 7, wherein when cast, the casting has an average % creep deformation at 150°C of less than or equal to about 0.04%, an average ultimate tensile strength at 150°C of at least about 183 MPa, an average tensile yield strength at 150°C of at least about 116 MPa, and an average % elongation at 150°C of less than or equal to at least about 17%.

12. (original) The magnesium-based, semi-solid casting alloy of claim 11, wherein when cast, the casting has an average % creep deformation at 150°C of about 0.04%, an average ultimate tensile strength at 150°C of about 183 MPa, an average tensile yield strength at 150°C of about 116 MPa, and an average % elongation at 150°C of about 17%.

13. (original) The magnesium-based, semi-solid casting alloy of claim 1, wherein the casting is cast using a thixotropic casting process.

14. (original) The magnesium-based, semi-solid casting alloy of claim 7, wherein the casting is cast using a thixotropic casting process.

15. (original) The magnesium-based, semi-solid casting alloy of claim 1, wherein the alloy has a structure including primary magnesium particles having a mean size of from about 20 to about 150 μm in a matrix of grains of magnesium having a mean size of from about 5 μm to about 20 μm reinforced with Al_4Sr intermetallic homogeneously dispersed particles having a mean size of from about 1 μm to about 10 μm .

16. (original) The magnesium-based, semi-solid casting alloy of claim 7, wherein the alloy has a structure including primary magnesium particles having a mean size of from about 20 to about 150 μm in a matrix of grains of magnesium having a mean size of from about 5 μm to about 20 μm reinforced with Al_4Sr intermetallic homogeneously dispersed particles having a mean size of from about 1 μm to about 10 μm .

17. (original) A magnesium-based casting having improved elevated temperature performance when cast from a semi-solid alloy slurry, the slurry comprising, in weight percent, from about 3 to 7% aluminum, from about 0.5 to 3% strontium, with the balance being magnesium, except for impurities commonly found in magnesium alloys, wherein, the semi-solid alloy slurry includes up to about 20% of a solid fraction by weight.

18. (original) The magnesium-based casting of claim 17, wherein the casting comprises from 4.5 to 5.5% aluminum.

19. (original) The magnesium-based casting of claim 17, wherein the alloy comprises from 1.2 to 2.2% strontium.

20. (original) The magnesium-based casting of claim 18, wherein the alloy comprises from 1.2 to 2.2% strontium.

21. (original) The magnesium-based casting of claim 17, wherein the casting has an average % creep deformation at 150°C of less than or equal to about 0.04%, an average ultimate tensile strength at 150°C of at least about 174 MPa, an average tensile yield strength at 150°C of at least about 112 MPa, and an average % elongation at 150°C of less than or equal to about 20%.

22. (original) The magnesium-based casting of claim 21, wherein the casting has an average % creep deformation at 150°C of about 0.04%, an average ultimate tensile strength at 150°C of about 174 MPa, an average tensile yield strength at 150°C of about 112 MPa, and an average % elongation at 150°C of about 20%.

23. (original) A magnesium-based casting having improved elevated temperature performance when cast from a semi-solid alloy slurry, the slurry comprising, in weight percent, from about 3 to 7% aluminum, from about 0.5 to 3% strontium, with the balance being magnesium, except for impurities commonly found in magnesium alloys, wherein, the semi-solid alloy slurry includes up to about 5% of a solid fraction by weight.

24. (original) The magnesium-based casting of claim 23, wherein the casting comprises from 4.5 to 5.5% aluminum.

25. (original) The magnesium-based casting of claim 23, wherein the casting

comprises from 1.2 to 2.2% strontium.

26. (original) The magnesium-based casting of claim 24, wherein the casting comprises from 1.2 to 2.2% strontium.

27. (original) The magnesium-based casting of claim 23, wherein when cast, the casting has an average % creep deformation at 150°C of less than or equal to about 0.04%, an average ultimate tensile strength at 150°C of at least about 183 MPa, an average tensile yield strength at 150°C of at least about 116 MPa, and an average % elongation at 150°C of less than or equal to about 17%.

28. (original) The magnesium-based casting of claim 27, wherein when cast, the casting has an average % creep deformation at 150°C of about 0.04%, an average ultimate tensile strength at 150°C of about 183 MPa, an average tensile yield strength at 150°C of about 116 MPa, and an average % elongation at 150°C of about 17%.

29. (original) The magnesium-based casting of claim 17, wherein the casting is cast using a thixotropic casting process.

30. (original) The magnesium-based casting of claim 23, wherein the casting is cast using a thixotropic casting process.

31. (original) The magnesium-based semi-solid casting of claim 17, wherein said alloy has a structure including primary magnesium particles having a mean size of from about 20 to about 150 μm in a matrix of grains of magnesium having a mean size of from about 5 μm to about 20 μm reinforced with Al_4Sr intermetallic homogeneously dispersed particles having a mean size of from about 1 μm to about 10 μm .

32. (original) The magnesium-based semi-solid casting of claim 23, wherein said alloy has a structure including primary magnesium particles having a mean size of from about 20 to about 150 μm in a matrix of grains of magnesium having a mean size of from about 5 μm to about 20 μm reinforced with Al_4Sr intermetallic homogeneously dispersed particles having a mean size of from about 1 μm to about 10 μm .

33. (previously presented) The magnesium-based semi-solid casting alloy of claim 1, wherein the alloy includes Al_4Sr intermetallic.